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G4006

PROTECTING OUR

ATMOSPHERE & ENVIRONMENT

Activities To Build Awareness & Understanding



Malcolm Watson and Les Ray



PROTECTING OUR ATMOSPHERE & ENVIRONMENT

Acknowledgements

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PROTECTING OUR ATMOSPHERE

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Teacher's Guide & Planning

The Key Issues

- The number of vehicles, planes and ships is growing rapidly.
- Most oil-based transport produces fumes that harm the environment and our bodies.
- The way forward has to be reducing the fumes produced.
- Hydrogen and electrical-powered transport is the current hope for cleaner air.

Additional Activities

Language

- Write a letter to a local newspaper asking for more cycle lanes and secure places to park bicycles to be provided. Give at least four reasons why this is a good thing.

Maths and Science

- How did Beijing reduce the amount of air pollution for the 2008 Olympic Games?
- Car magazines and web sites publish lists of emissions from cars. Find out the cleanest and dirtiest cars available. Are modern cars cleaner than older ones?

Art and Humanities

- Design a one-page advert for an electric car. Take pictures from the internet. Write your own sales points. Focus on the 'green' credentials for the car.

Research

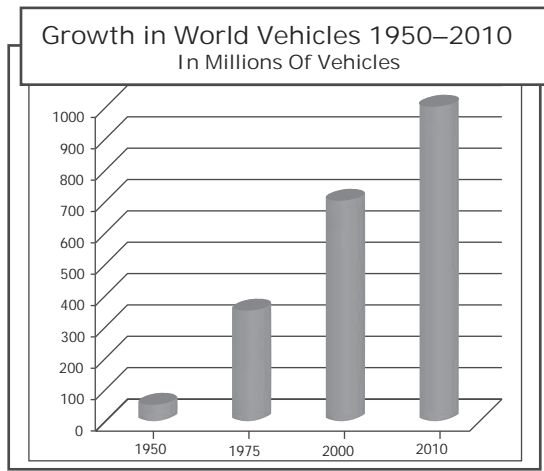
- What types of electric car can you buy? How do they compare to traditional cars in terms of price, running costs and pollution?
- Investigate how Mexico City, Athens, Los Angeles and Tokyo are trying to reduce the vehicle pollution problem.
- Are face masks good protection from car exhaust fumes?

More Information

Oil burning vehicles contribute net carbon gasses, mainly carbon monoxide and carbon dioxide, into the atmosphere which contribute to global warming. The products of combustion also produce additional local pollution through the emission of nitrogen oxides, sulphur and carbon particulates (soot), all of which can be very detrimental to health. Electric vehicles emit no pollutants but increase pollution where the electricity is generated meaning that globally only electricity from renewable sources is a solution. Hydrogen fuel-cell technology also offers hope for the future. Initiatives to move urban dwellers to use more public transport are also important.

PROTECTING OUR ATMOSPHERE From Fumes

Most forms of transport burn oil. The exhaust gasses contain dirty smoke particles and chemicals that pollute the air.



• Look at the pictures and graph. Answer these questions.

• Name four types of transport that pollute the air.

• List how many vehicles there were in the world in

1950, _____
1975, _____
2000, _____
2010, _____

• By the time you have your own grandchildren, will there be even more vehicles than now?

• How many times more? _____

• Why will there be more vehicles? _____

• Think of ways in which we can stop the growth in pollution from vehicles.

Here are some key words. STOP. CHANGE. REDUCE. RENEWABLE.

PROTECTING OUR ATMOSPHERE

From Carbon Dioxide

Teacher's Guide & Planning

The Key Issues

- We have been increasing the amount of carbon dioxide in the air by burning too many fossil fuels.
- Too much carbon dioxide in the air is creating the 'greenhouse effect'.
- This is making the earth warmer, changing the climate and raising sea levels.

Additional Activities

Language

- Plan some persuasive writing (a speech, a letter, an argument) to change the behaviour of people about how they travel to school and how they heat their homes.
- Write poems about 'gasses' considering the onomatopoeic nature of the word and the way that they move in air.

Maths and Science

- Draw a pie chart, perhaps using a computer program, to show the constituents of the air that we breathe.
- Make different kinds of graphs using the data on the sheet. Which is the best way to represent the data?
- Plan some experiments to investigate the properties of carbon dioxide, e.g. in air, in water.

Art and Humanities

- Make a collage to show the various ways that carbon dioxide is produced at home and in school, without us being aware of the fact.
- Make artwork to show how carbon dioxide is creating the greenhouse effect.
- Choose two contrasting areas of the world, e.g. the Arctic and the Amazon. Find out how too much carbon dioxide is affecting the lives of people and animals there – and so their economies.

Research

- Investigate solar and wind power. What are the advantages and disadvantages of both?
- Find out what fossil fuels are needed to create power and energy for our homes and vehicles. How do they create carbon dioxide?

More Information

Carbon dioxide is one of the most abundant gasses in the atmosphere and plays an important part in vital plant and animal processes, such as photosynthesis and respiration. However, humans have been increasing the amount of carbon dioxide in air by burning of fossil fuels and by carrying out land clearing and forest burning. About 22% of the current atmospheric CO₂ concentrations exist due to these human activities. This has caused an environmental problem.

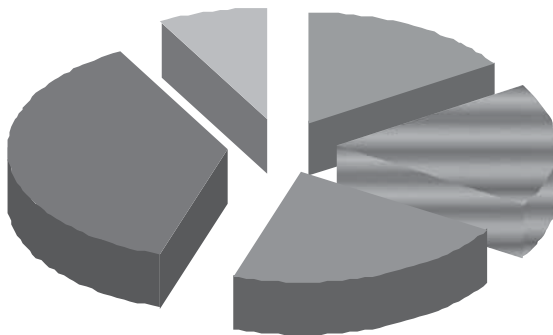
PROTECTING OUR ATMOSPHERE

From Carbon Dioxide

Too much carbon dioxide in the air is creating the 'greenhouse effect', making the earth warmer. This is changing the climate and raising sea levels.

- Look at the major sources of carbon dioxide in the air.
- Explain how each is produced.

Air is made up of 78% nitrogen, 21% oxygen and 1% that is a mixture of argon, neon, and carbon dioxide.



- Heating homes 16%
- Industry 18%
- Road transport 21%
- Energy generation 37%
- Other 8%



- Here are some ways of protecting our air from carbon dioxide. In the boxes below, explain how they will do this.

Recycling	Wind power	Solar power	Cycling

PROTECTING OUR ATMOSPHERE

The Great London Smog Of 1952

Teacher's Guide & Planning

The Key Issues

- Polluting the air was a real problem. Laws have changed people's habits and protected the environment.
- The air still contains pollutants, many of them from vehicle exhausts. They are less visible than the pollutants of the past, but are equally toxic, causing eye irritation, asthma and bronchial complaints.

Additional Activities

Language

- Imagine that you were a child living through the Great Smog in 1952. Describe through your senses what you saw, heard, smelled, tasted, etc.
- Write sensational newspaper reports of the time. Who would you interview to get the facts? Who would you blame?
- Write a piece about returning to London fifty years later. What was it like? How had it changed? Why?

Maths and Science

- Find data of births and deaths in your area over time. Graph these and discuss if there are any reasons for rises and falls.
- Investigate the characteristics (safely) of some of the gasses mentioned in the activity.
- Discuss why the noxious fumes could not escape through the fog.

Art and Humanities

- Create 'smog' pictures, where the colour is predominantly grey and just glimpses of objects can be seen.
- Invent drama pieces, with props, where characters are lost or ill in the smog. How do they act?
- Where else in the world are there still problems like this? Investigate air quality in Far Eastern countries such as China, and discuss what they are doing to solve the problem.

Research

- Investigate the life and work of Charles Dickens who took London as the background for his social novels in the nineteenth century.
- Find out more about the impact of the Clean Air Act.

More Information

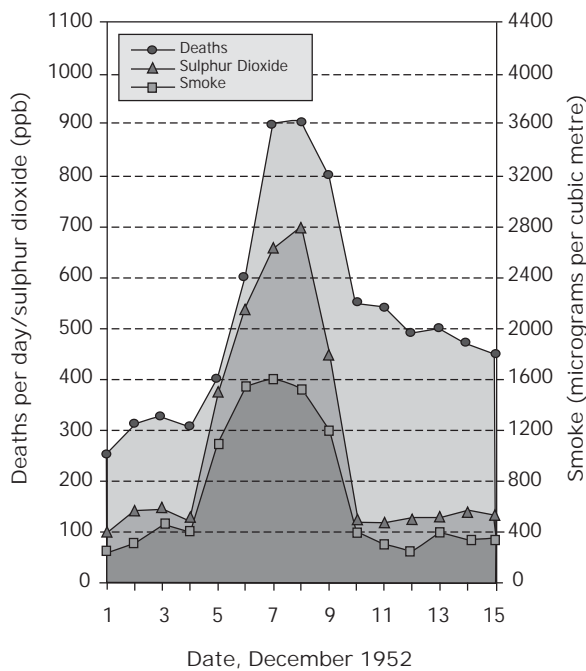
The total number of deaths in Greater London in the week ending 6 December 1952 was 2,062, which was close to normal for the time of year. The following week, the number was 4,703. The death rate peaked at 900 per day on the 8th and 9th and remained above average until just before Christmas. The Clean Air Act aimed to control domestic sources of smoke pollution by introducing smokeless zones. In these areas, smokeless fuels had to be burnt.

PROTECTING OUR ATMOSPHERE

The Great London Smog Of 1952

On December 4th 1952, fog and smoke from burning coal combined in London. The 'smog' lasted for five days. This was one of the worst cases of air pollution.

- Look at the graph to see some of the effects of air pollution.



On each day during the foggy period, 1,000 tonnes of smoke particles, 2,000 tonnes of carbon dioxide, 140 tonnes of hydrochloric acid and 14 tonnes of fluorine compounds were found in the air.



How many people died from 4 to 9 of December 1952?

How much more than usual was this?

What relationship do you notice about the levels of sulphur dioxide and smoke over these 5 days?

Why do you think there was such an increase in the number of deaths?

A Clean Air Act was introduced in 1956. This Act aimed to control smoke pollution by introducing smokeless zones. In these areas, smokeless fuels had to be burnt.

- Explain why the following were the result:
 - domestic emissions were reduced
 - electric and gas usage increased
 - power stations were built in rural areas.

